TREND STUDY 1-5-96

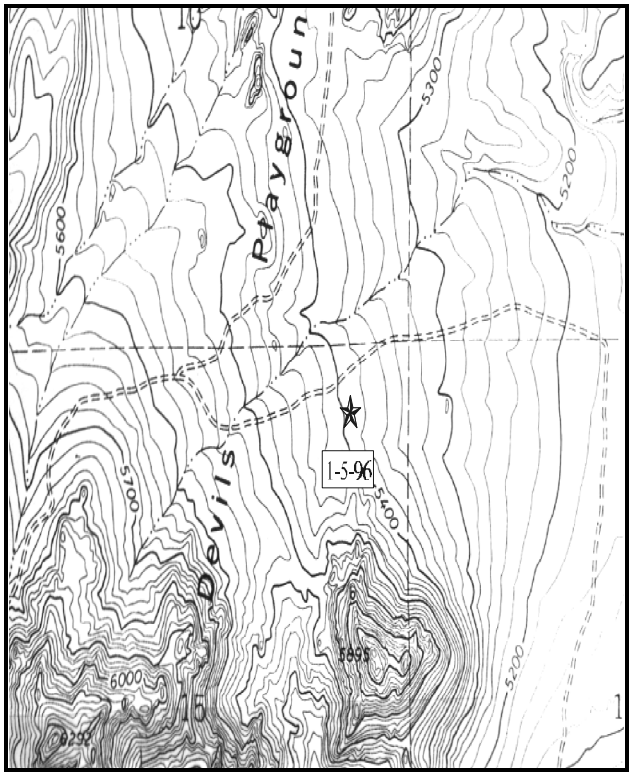
Study site name: Devil's Playground . Range type: Juniper .

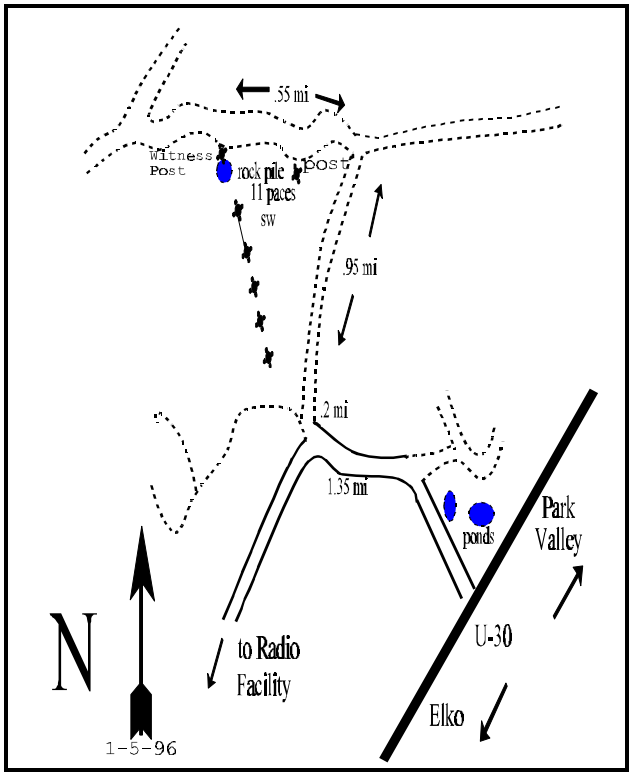
Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) Line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Proceed toward Elko, Nevada on U-30 to mile marker 24 and turn right (west). Begin to note mileage here. Travel 1.35 miles to a fork and bear right. Travel 0.2 miles to a large, flat rock and rockpile on the left side of the road. Walk 11 paces south by west from the rockpile to the 0-foot stake of the frequency baseline. The baseline is marked by a red browse tag #708. The azimuth of the baseline is 180 degrees due south.





Map Name: Emigrant Pass, Utah Diagrammatic Sketch

Township 9N , Range 16W , Section 15 , UTM COOR: 2-78-238E 45-98-600N

DISCUSSION

Trend Study No. 1-5

This study samples critical deer winter range in the "Devils Playground." This is an area of gentle (5%-10%) east facing slopes interrupted by large granite outcrops. The vegetation is dominated by juniper-pinyon woodland with numerous and various sized openings occupied by black sagebrush and big sagebrush. The study site is a mixed sagebrush/J-P woodland type at about 5,390 feet elevation. Further to the east, vegetation becomes increasingly dominated by black sagebrush in the more shallow soils. To the west and at a higher elevation, J-P woodland is associated with significant amounts of big sagebrush-bitterbrush. Deer and sheep are the primary forage users. This area is within the White Lakes allotment which allows 1,500 sheep to use the area from December 1st through March 31st. Winter deer pellet groups are also abundant with a quadrat frequency of 44% in 1996.

Soil on the site is derived from granite parent material. It is a coarse textured sandy loam which is light colored on the surface, but much darker below. Ground cover from vegetation or litter is moderately poor and there are extensive areas of erosion pavement and bare ground between shrubs and trees. The soil appears highly erodible and erosion would increase if the terrain was steeper. The soil is deep and well drained. Average effective rooting depth was estimated to be nearly 27 inches. Soil temperature is also fairly high, averaging 60°F at an average depth of 20 inches. Soil temperatures at other sites in the area are also relatively high. The sandy texture and the excessive drained nature of the soil are the main reasons this area is dominated by black sagebrush instead of basin big sagebrush.

Browse composition consists chiefly of black sagebrush, interspersed by smaller amounts of narrowleaf low rabbitbrush, prickly phlox, and basin big sagebrush. Also present are scattered individuals of Nevada ephedra and spiny hopsage. Black sagebrush numbered 4,266 plants/acre in 1984, increasing to 5,960 by 1996. The population has good vigor except for some of the decadent individuals. Utilization was heavy in 1984 when 86% of the mature and decadent plants displayed heavy use. This probably is the factor most responsible for partial crown death observed in many of the sagebrush. Use was mostly light in 1990, but percent decadence still increased from 56% in 1984 to 82% in 1990. Twenty-six percent of these decadent sagebrush were classified as dying (1,127 plants/acre). Drought combined with the excessively drained characteristics of the soil are likely responsible for this increased decadence. During the 1996 reading, utilization was moderate to heavy with 14% of the mature and decadent plants displaying heavy use. Percent decadency declined to 26%. It appears that many of the decadent shrubs sampled in 1990, recovered as evidenced by the decrease in the number of decadent plants. There are still approximately 340 decadent plants/acre classified as dying. Seedlings and young plants are fairly numerous and in sufficient numbers to maintain the population. Narrowleaf low rabbitbrush, showed similar heavy use with 38% in 1984. Currently these shrubs appear unutilized. A few spiny hopsage occur on the site, but none were sampled within the shrub density strips. These shrubs were heavily hedged and appeared to be dying.

The herbaceous understory is fairly diverse but not abundant. Five species of perennial grasses combine to produce about 5% cover. Dominant species include, bluebunch wheatgrass, Sandberg bluegrass, and bottlebrush squirreltail. Annual grasses and forbs are numerous, but not dense enough to constitute a fire hazard. Forbs are diverse but produce only about 2% total cover. Most are low growing and of little forage value.

1984 APPARENT TREND ASSESSMENT

Trend assessment on this site is influenced greatly by animal use, soil characteristics, and plant composition. The first factor, animal use, has no doubt had a substantial effect on almost all trend parameters. Use is very heavy and has possibly influenced an unsatisfactory age structure in the key browse species as well as a general depletion of the herbaceous understory. In turn, ground cover and soil organic content has been reduced, which has led to a significant but not extreme rate of soil erosion. One other factor should be considered. The study site is within an area where expansion and gradual thickening of the juniper-pinyon type is very likely to occur. Current conditions are such that this process is likely to be enhanced. Both soil and vegetative trends are declining.

1990 TREND ASSESSMENT

Black sagebrush, on this important wintering area, has declined significantly in nested frequency since 1984. Recent use was judged to be light, compared to heavy use by sheep and deer in previous years. Black sagebrush contains a very high number of decadent plants (82%). It provides most of the cover on the study site, where there is a relatively low density of pinyon and juniper. Surrounding areas support a much higher density of trees, but still it is not usually a closed canopy. There is a vigorous stand of native grasses for the range type. Four out of five perennial grasses increased in sum of nested frequency and quadrat frequency values. Percent bare ground has decreased slightly (36% to 32%) but litter cover decreased substantially (40% to 27%). Soil erosion is still active but is not serious.

TREND ASSESSMENT
soil - down
browse - down
herbaceous understory - improving but depleted

1996 TREND ASSESSMENT

Protective ground cover characteristics have changed somewhat since 1990. Percent bare ground has declined from 32% to 20%, but some of the increase is due to an increase in pavement cover. Pavement and rock cover have increased since 1984 and currently cover nearly 30% of the ground surface. Litter cover has also declined steadily since 1984 (40% to 27%). The soil is very porous due to the sandy texture, however there are some signs of soil pedestaling and there is an active gully between lines 2 and 3. Trend for soil is considered stable but in poor condition. The browse trend for the key species, black sagebrush is up. Percent decadence has declined from an extremely high 82% in 1990 to 26%. Utilization is moderate with heavy use reported on only 14% of the population. Vigor is good on all but 22% of the decadent sagebrush. The increaser, narrowleaf low rabbitbrush appears to have a stable trend. Spiny hopsage, likely the most preferred browse on the site, occurs in small numbers and appears to be dying out due to heavy use and lack of reproduction. Trend for the herbaceous understory is mixed. Trend for grasses is down with a decline in the nested frequencies in 4 out of the 5 perennial species sampled in 1990. Trend for forbs is up with an increase in diversity and sum of nested frequency of perennial species. Since forbs contribute little to the total herbaceous cover on the site, trend is still considered slightly down.

TREND ASSESSMENT
soil - stable but in poor condition
browse - up for black sagebrush which makes up 62% of the browse cover
herbaceous understory - slightly down

HERBACEOUS TRENDS --
Herd unit 01 , Study no: 5

Type	Species	Nested Frequency '84	'90	'96	Quadrat Frequency '84	'90	'96	Average Cover % '96
G	Agropyron spicatum	$_{a}$28	$_{b}$56	$_{ab}$46	14	22	20	1.00
G	Bromus tectorum (a)	-	-	97	-	-	45	.37
G	Oryzopsis hymenoides	$_{a}$4	$_{b}$17	$_{b}$18	2	10	9	.66
G	Poa compressa	$_{a}$-	$_{a}$-	$_{b}$74	-	-	30	1.57
G	Poa secunda	$_{a}$53	$_{b}$162	$_{a}$74	26	66	30	1.33
G	Sitanion hystrix	$_{a}$114	$_{a}$100	$_{b}$56	50	49	30	.66
G	Stipa thurberiana	$_{a}$11	$_{a}$22	$_{b}$-	5	11	-	-
G	Vulpia octoflora (a)	-	-	78	-	-	32	.16
Total for Grasses		210	357	443	97	158	196	5.76
F	Agoseris glauca	$_{a}$-	$_{a}$-	$_{b}$17	-	-	7	.03
F	Astragalus beckwithii	2	7	3	1	2	3	.04
F	Aster spp.	-	-	76	-	-	33	.16
F	Astragalus utahensis	10	14	11	5	7	6	.08
F	Castilleja chromosa	11	1	7	6	1	3	.06
F	Chaenactis douglasii	$_{a}$22	$_{b}$4	$_{a}$28	11	4	12	.08
F	Crepis acuminata	-	-	3	-	-	1	.03
F	Cruciferae (a)	-	-	31	-	-	14	.07
F	Cryptantha spp.	$_{a}$-	$_{a}$4	$_{b}$93	-	2	37	.36
F	Delphinium spp.	-	-	3	-	-	1	.00
F	Descurainia spp. (a)	-	-	4	-	-	2	.01
F	Eriogonum cernuum (a)	1	6	10	1	3	5	.02
F	Eriogonum ovalifolium	$_{a}$-	$_{a}$-	$_{b}$13	-	-	5	.05
F	Gayophytum ramosissimum (a)	-	-	35	-	-	14	.09
F	Gilia spp. (a)	-	-	21	-	-	8	.04
F	Lomatium spp.	-	-	4	-	-	1	.00
F	Lygodesmia spinosa	-	-	-	-	-	-	.00
F	Navarretia intertexta (a)	-	-	78	-	-	34	.17
F	Phlox hoodii canescens	-	8	4	-	4	2	.03
F	Phlox longifolia	35	23	35	17	12	16	.10
F	Phlox spp. (a)	-	-	102	-	-	37	.43
F	Townsendia spp.	-	2	-	-	1	-	-
F	Tragopogon dubius	$_{a}$13	$_{b}$-	$_{b}$2	6	-	1	.03
Total for Forbs		94	69	580	47	36	242	1.94

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 01 , Study no: 5

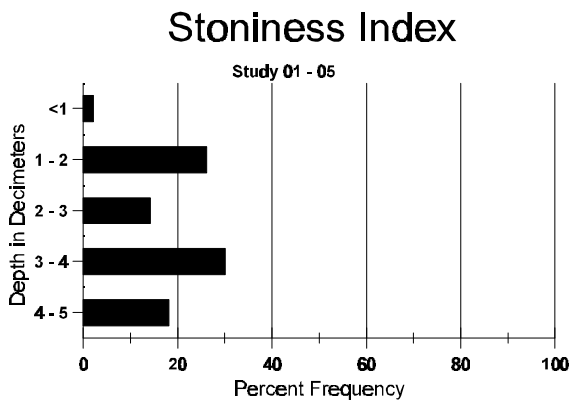
Type	Species	Strip Frequency '96	Average Cover % '96
B	Artemisia nova	86	11.55
B	Artemisia tridentata tridentata	7	.60
B	Chrysothamnus viscidiflorus stenophyllus	50	1.50
B	Juniperus osteosperma	3	4.88
B	Leptodactylon pungens	10	.16
B	Opuntia fragilis	1	-
B	Pinus monophylla	2	.00
B	Symphoricarpos oreophilus	1	-
Total for Browse		160	18.70

BASIC COVER --
Herd unit 01 , Study no: 5

Cover Type	Nested Frequency '96	Average Cover % '84	'90	'96
Vegetation	310	2.50	8.25	25.64
Rock	121	.25	.50	1.48
Pavement	341	20.75	25.00	27.95
Litter	371	39.75	33.00	27.04
Cryptogams	45	1.25	1.50	.72
Bare Ground	275	35.50	31.75	19.56

SOIL ANALYSIS DATA --
Herd Unit 01, Study no: 5

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
26.2	59.6 (19.7)	8.0	65.7	17.0	17.3	.98	3.5	92.8	.5



PELLET GROUP FREQUENCY --
Herd unit 01 , Study no: 5

Type	Quadrat Frequency '96
Rabbit	32
Elk	2
Deer	44

BROWSE CHARACTERISTICS --
Herd unit 01 , Study no: 5

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia nova																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	96	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
Y	84	1	4	2	-	-	-	-	-	-	7	-	-	-	466			7
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	8	14	-	-	-	-	-	-	-	22	-	-	-	440			22
M	84	-	3	18	-	-	-	-	-	-	20	-	1	-	1400	9	16	21
	90	13	-	-	1	-	-	-	-	-	14	-	-	-	933	10	15	14
	96	19	122	33	1	20	3	-	-	-	198	-	-	-	3960	9	23	198
D	84	-	4	31	1	-	-	-	-	-	24	-	12	-	2400			36
	90	64	1	-	-	-	-	-	-	-	48	-	-	17	4333			65
	96	11	56	6	3	2	-	-	-	-	61	-	-	17	1560			78
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	740			37
Total Plants/Acre (excluding Dead & Seedlings)													'84		4266	Dec:		56%
													'90		5266			82%
													'96		5960			26%

AGE	YR	Form Class (No. of Plants)									Vigor Class				Plants Per	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4	Acre	Ht.	Cr.	
Artemisia tridentata tridentata																		
S	84	-	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	84	-	-	1	-	-	-	-	-	-	1	-	-	-	66			1
	90	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	84	-	1	-	-	-	-	-	-	-	1	-	-	-	66	20	25	1
	90	1	-	-	-	-	-	-	-	-	1	-	-	-	66	21	29	1
	96	5	6	-	-	-	-	-	-	-	11	-	-	-	220	21	39	11
D	84	-	3	-	-	-	-	-	-	-	3	-	-	-	200			3
	90	1	2	-	-	-	-	-	-	-	2	1	-	-	200			3
	96	-	2	-	-	-	-	-	-	-	2	-	-	-	40			2
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)													'84		332	Dec:		60%
													'90		332			60%
													'96		260			15%
Chrysothamnus viscidiflorus stenophyllus																		
S	84	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	84	6	1	1	-	-	-	-	-	-	8	-	-	-	533			8
	90	17	-	-	1	-	-	-	-	-	18	-	-	-	1200			18
	96	6	-	-	1	-	-	-	-	-	7	-	-	-	140			7
M	84	3	5	8	-	-	-	-	-	-	16	-	-	-	1066	10	11	16
	90	10	1	-	5	-	-	-	-	-	16	-	-	-	1066	15	19	16
	96	61	5	-	10	-	-	1	-	-	77	-	-	-	1540	9	13	77
D	84	-	3	2	-	-	-	-	-	-	4	-	1	-	333			5
	90	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Total Plants/Acre (excluding Dead & Seedlings)													'84		1932	Dec:		17%
													'90		2332			3%
													'96		1680			0%
Ephedra nevadensis																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	16	17	0
Total Plants/Acre (excluding Dead & Seedlings)													'84		0	Dec:		-
													'90		0			-
													'96		0			-
Grayia spinosa																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	31	35	0
Total Plants/Acre (excluding Dead & Seedlings)													'84		0	Dec:		-
													'90		0			-
													'96		0			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus osteosperma																		
S	84	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	3	-	-	-	-	-	-	-	-	3	-	-	-	60	-	-	3
Total Plants/Acre (excluding Dead & Seedlings)													'84		0	Dec:		-
													'90		0			-
													'96		60			-
Leptodactylon pungens																		
Y	84	7	-	-	-	-	-	-	-	-	7	-	-	-	466			7
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	2	-	-	-	-	-	2	-	-	4	-	-	-	80			4
M	84	1	-	-	-	-	-	-	-	-	1	-	-	-	66	4	4	1
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	11	-	-	1	-	-	-	-	-	12	-	-	-	240	9	11	12
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Total Plants/Acre (excluding Dead & Seedlings)													'84		532	Dec:		0%
													'90		0			0%
													'96		360			11%
Opuntia fragilis																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	7	1
Total Plants/Acre (excluding Dead & Seedlings)													'84		0	Dec:		-
													'90		66			-
													'96		20			-
Pinus monophylla																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	1	-	-	1	-	-	-	20			1
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
Total Plants/Acre (excluding Dead & Seedlings)													'84		0	Dec:		-
													'90		0			-
													'96		40			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Symphoricarpos oreophilus																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	1	-	-	-	-	-	-	-	1	-	-	-	20	16	23	1
Total Plants/Acre (excluding Dead & Seedlings)													'84		0	Dec:		-
													'90		0			-
													'96		20			-